

**BEEES (HYMENOPTERA, APOIDEA) COLLECTED AT
CHICHEN ITZÁ, YUCATAN, BY THE HARVARD
EXPEDITIONS OF 1929-1930.**

By T. D. A. COCKERELL, University of Colorado, Boulder, Colo.

The bees listed below were collected in Yucatan, in June, 1929, and February, 1930, during the Expeditions organized by Dr. George C. Shattuck, of the Department of Tropical Medicine of Harvard University Medical School, jointly with the Carnegie Institution of Washington. The expedition was primarily interested in medical problems, and the collecting of insects, not connected with such problems, was merely incidental. The 64 species listed below are therefore only a fragment of the bee fauna of Yucatan, which, so far as I have been able to learn, had never before been investigated. The surprisingly large number of new forms (25) is due, I believe, in large part to the peculiar ecological conditions of the State of Yucatan, which differ not only from those of Mexico proper and Central America, but even from those of the other parts of the Peninsula (the State of Campeche and the Territory of Quintana Róo).

With the exception of a few ranges of low hills, in the extreme southwest, the State of Yucatan is uniformly level and built chiefly of horizontal strata of coral limestone. There is no permanent superficial water, either stagnant or flowing, and the natural water supply is restricted to rain and the deep underground cisterns or wells known in the vernacular as "cenotes." The climate, although tropical, is not very hot and much tempered by sea-breezes, even during the summer. It is extremely dry during the winter and spring, with little or no rain from January till May. The vegetation then gradually comes to rest; the herbaceous plants dry up and most of the bushes and trees drop their leaves. Eventually most of the underbrush is burned by the natives and by April the country presents a most desolate outlook. Toward the middle of May, with the first rains, the vegetation revives, and by June the country is pleasantly green and many of the plants are in full bloom. The rains continue, generally with increasing violence, until December. Over much of Yucatan the original vegetation has been practically wiped out to give way to extensive and monotonous plantations of "henequen" or sisal (*Agave rigida*, or related species). Fortunately, in the vicinity of

Chichen Itzá but little destruction has been wrought. Here the country is covered with dense, but rather low, subxerophytic bush, on the average 30 feet high, with many thorny elements. A few, scattered, larger trees reach 50 to 75 feet. There are many creepers, and epiphytes (especially Bromeliaceae) are fairly numerous in spots. Herbaceous plants, especially grasses and sedges, are very few and Cactaceae also are scarce.

These subxerophytic conditions are on the whole favorable to wild bee life. Most probably the month of June, with its abundance of flowers, was as propitious as any for the study of these insects. I found that the flowers of some of the weeds in the abandoned fields of the Mayas—especially the two Compositae, *Baltimora recta* L. and *Melampodium divaricatum* (L. Rich.), as well as *Boerhaavia erecta* L. and *Ruellia tuberosa* L.—made very profitable collecting. Many of the smaller bees were also attracted by the dense flower racemes of *Acacia Gaumeri* Blake and *Acacia riparioides* (Britt. and Rose). These plants were named from specimens collected by me in Yucatan and sent to Dr. Paul C. Standley, of the U. S. National Museum.

Unless otherwise indicated, all the species listed were obtained at Chichen Itzá, a locality in the southwestern part of the State, well known for its remarkable Maya ruins. The new forms were described by Professor Cockerell in the *Annals and Magazine of Natural History*, (10), VIII, 1931, pp. 413-417 and 537-553, and the types are at the Museum of Comparative Zoölogy of Harvard University.—*J. Bequaert*.

Hylaeus crenulatus (Cockerell).—Three males; two have the face reddened by cyanide.

Hylaeus subgriseus (Cockerell).—One female, at flowers of *Ehretia tinifolia* L. Previously known from a specimen collected at San Rafael, Vera Cruz.

Halictus townsendi Cockerell.—One female. Known from all other Halictines in the collection by the entirely black tegument and the toothed cheeks.

Agapostemon nasutus Smith.—One male. The abdomen has yellow and black bands.

Agapostemon purpureopictus Cockerell.—One female. Known from other Halictines in the collection by the rich but dull purple of thorax above and the entirely black abdomen with white hair-bands. The hind spur has three large spines, the basal one longest, spear-head-shaped, the other two obliquely truncate. The

specimen agrees very closely with the description of this species, from Guaymas in Sonora, but is peculiar for the abundant black, or almost black hair on vertex, and the anterior and middle femora red at apex in front, and their tibiæ red in front. It is possible, though I suppose not very probable, that this is the female of the insect described from Guatemala as *A. nasutus gualanicus* Cockerell.

Augochlora (Augochloropsis) chorisis Vachal.—Two females. A rather small species, with brilliant emerald green abdomen. It is perhaps to be regarded as a subspecies of *A. fervida* Smith, which is common in the United States.

Augochlora (Augochloropsis) gemmicauda Cockerell (1931, p. 553).—One female.

Augochlora (Pseudaugochloropsis) binghami Cockerell.—Two males. The antennæ are hooked at the tip. In the female (not in the collection) the abdomen lacks vibrissæ, but the hind spurs are pectinate.

Augochlora (Odontochlora) nigrocyanea Cockerell.—One female. The specimen is remarkable for its venation, the same on both sides, with the first transverse cubital uniting with the second, diverging below to leave a small triangle so that at first sight it appears that there are only two cubital cells. This is like the condition in the Panurgids *Xerophasma* and *Alloperdita*, but I presume that in *Augochlora* it represents only an individual aberration.

Augochlora (Odontochlora) viridinitens Cockerell (1931, p. 551).—One female.

Augochlora (Augochlora) cyanaspis Cockerell (1931, p. 552).—Two females.

Augochlora (Augochlora) urania Smith.—Two females. A small yellowish-green species.

There are in addition a male and three females (these all different species) of small *Augochlora*, which it does not seem profitable to deal with at the present time.

Calliopsis andreniformis Smith.—One of each sex, taken in copula. It is extremely surprising to find this common United States species in Yucatan.

Euglossa cordata (Linnaeus).—Two females.

Centris nitida subsp. *geminata* Cockerell.—Two females from Chichen Itzá and one from Mérida. This insect was described from Guayaquil, Ecuador. The original *C. nitida* Smith was de-

scribed from Honduras. It is possible that comparison with Smith's type will show that subsp. *geminata* cannot be maintained; but on the characters assigned, the present specimens are *geminata*.

Centris tarsata Smith.—A small female.

Centris lanipes (Fabricius).—Three females.

Melissodes masuca Cockerell.—Seven females and three males. The females have hair on thorax above bright fox-red, and the males have the nervures very dark, but it seems impossible to separate the species from *M. masuca*, which ranges north to Texas. It has been taken at Victoria, Mexico.

Chalepogenus moestus (Cresson).—Two males and a female. Both sexes at *Tamonea curasavica* Persoon (Verbenacæ).

Tetrapedia maura Cresson.—Three females; visits *Tamonea curasavica* and superficially looks exactly like *Chalepogenus moestus* (Cresson).

Tetrapedia flavopicta Cockerell (1931, p. 413).—Six females.

Ancylosceles armata (Smith).—Eight females. About half have dark antennæ, with the flagellum dusky reddish beneath, but this is evidently only a variation. These darker specimens can hardly be separated from *A. melanostoma* Cockerell, in the female sex. In the male, *A. melanostoma* has the mandibles and clypeus all black, whereas *A. armata* has a whitish band on clypeus. Those differences may well be racial than specific.

Exomalopsis mellipes Cresson.—One female. A second *Exomalopsis* represents a species I do not recognize, but the condition is unsatisfactory.

Epeolus cameroni Meade-Waldo.—Several females and one male. Described by Cameron as *E. bifasciatus*.

Epeolus bifasciatus subsp. *obscuripes* Cockerell.—Four females and a male. This is a very distinct race of *E. bifasciatus* Cresson (not Cameron), perhaps deserving to rank as a species. The scutellum varies from black to red.

Nomada nitidiceps Cockerell (1931, p. 547).—One female.

MEGACHILE LATREILLE

The species in the collection may be separated thus:

Males	1
Females	7
1. Transverse keel of sixth tergite denticulate; anterior tarsi yellow and greatly modified	<i>poculifera</i> Cockerell.
Transverse keel of sixth tergite emarginate	2

2. Abdomen with ferruginous or pale orange hair-bands3
 Abdomen without red or yellow bands4
3. Anterior tarsi pale *veraecrucis* Cockerell.
 Anterior tarsi black *squamosa* Friese.
4. Small slender species, hardly 7 mm. long; anterior tarsi simple *chichimeca* Cresson.
 Broad and larger species5
5. Anterior legs red and yellow.
pollicaris subsp. *pereximia* Cockerell.
 Anterior legs black6
6. Larger; marginal cell and apex of wing fuliginous.
frugalis subsp. *atrescens* Cockerell.
 Smaller; marginal cell not fuliginous.
petulans subsp. *abnegata* Cockerell.
7. Anterior wings strongly flushed with orange, and a blackish subapical cloud; abdomen with reddish hair-bands.
aurantipennis Cockerell.
 Anterior wings not thus orange8
8. Abdomen with ferruginous or light orange hair dorsally . . .9
 Abdomen without red or orange hair dorsally10
9. Larger and stouter, legs largely red *adempta* Cockerell.
 Rather large, legs black *acculta* Cockerell.
 Smaller and more slender, legs black *squamosa* Friese.
10. Scopa black on last two sternites, otherwise white; red hair below clypeus *frugalis* subsp. *atrescens* Cockerell.
 Scopa not black on two sternites11
11. A conspicuous band of white hair behind scutellum, but none between scutellum and mesothorax; small species.
chichimeca Cresson.
 A band of white hair between scutellum and mesothorax; mostly larger12
12. A narrow but very distinct white hair-band behind scutellum; ventral scopa deep ferruginous . . *animosa* Cockerell.
 No band of white hair behind scutellum; scopa paler or white13
13. Smaller and narrower; clypeus short, with no trace of a smooth line; scopa white, black at tip of last sternite.
addubitans Cockerell.
 Larger and broader; clypeus longer, with a more or less evident smooth line. *petulans* subsp. *abnegata* Cockerell.

Megachile squamosa Friese (1916).—This is represented by numerous specimens, the majority females. My *M. knabi*, 1919, is exactly the same. When I described *M. knabi* the description

of *M. squamosa* had not reached me, owing to the conditions prevailing at that time.

Megachile chichimeca Cresson.—This is the next commonest species in the collection. The male, hitherto unknown, is represented by two specimens. It is slender, parallel-sided, black, with spined anterior coxæ but simple anterior tarsi. Face and front with long creamy white hair, but on under side of cheeks the hair is pure white; antennae long, slender, entirely black, not expanded at end; small joints of tarsi reddish; sixth tergite above rough, practically bare, the transverse keel with two large triangular projections, bounding a deep rounded emargination. In Friese's key of Mexican species this runs next to *M. mexicana* Cress., from which it is easily separated by the essentially bare sixth tergite. Its length is nearly 7 mm. *M. chichimeca* is also related to *M. perpunctata* Ckll., but is smaller, with less black on wings.

Megachile frugalis subsp. *atrescens* Cockerell (1931, p. 537).—One male and one female.

Megachile addubitans Cockerell (1931, p. 537).—One female.

Megachile petulans subsp. *abnegata* Cockerell (1931, p. 538).—One male and three females.

Megachile adempta Cockerell (1931, p. 538).—One female. This species belongs to the group of *M. fossoris* Smith. From that species it is easily distinguished by the ventral scopa. The following key separates several similar forms (females).

KEY

1. Thorax above with an admixture of black hairs (Guatemala)
 - montezuma* Cresson.
 - Thorax above without black hairs2
2. Ventral scopa all pale (Yucatan)*adempta* Cockerell.
 - Ventral scopa with much black3
3. Sixth tergite with much erect black hair (Mexico).
 - azteca* Cresson.
 - Sixth tergite with little or no erect black hair4
4. Scape dark with a little dusky red; abdominal hair-bands broader (Paraguay)*leucocentra* Schrottky.
 - Scape entirely bright ferruginous; abdominal bands narrower (Mexico)*rhodopus* Cockerell.
 - M. botanicorum* Cockerell is also allied.

Megachile animosa Cockerell (1931, p. 539).—One female.

Megachile acculta Cockerell (1931, p. 540).—One female.

Megachile poculifera Cockerell.—One male.

Megachile veraecrucis Cockerell.—One male. The antennae and tegulae are darker than in the type.

Megachile pollicaris subsp. *pereximia* Cockerell.—One male, similar to var. *a* from Texas.

Megachile aurantipennis Cockerell.—One female. According to Bequaert, this bee is a good mimic of *Pachodynerus nasidens* (Latreille) and other similarly colored Eumenidae, which are common at Chichen Itzá.

Ashmeadiella bequaerti Cockerell (1931, p. 543):—One male.

Heriades carinata var. *purpurascens* Cockerell (1931, p. 543).—Two females.

Hypanthidium yucatanicum Cockerell (1931, p. 544).—One female and one male.

Stelis yucatanica Cockerell (1931, p. 540).—Five females and two males.

Stelis (Odontostelis) abnormis Friese (1925).—One female (See Cockerell, 1931, p. 541).

Stelis shattucki Cockerell (1931, p. 542).—One male.

COELIOXYS LATREILLE

The species in the collection (females) are separated thus:

1. Scutellum densely and coarsely rugoso-punctate; last sternite broadly rounded at end *sanguinicollis* Friese.
Scutellum smooth and polished in middle 2
2. Margin of scutellum with no median projection.
ardescens subsp. *yucatanica* Cockerell.
Margin of scutellum conspicuously dentate or angulate in middle 3
3. Last sternite thickly fringed on each side with black hair.
speculifera Cockerell.
Last sternite not fringed with hair; scutellum red.
bequaertiana Cockerell.

Coelioxys sanguinicollis Friese.—One female. This differs from Friese's description in having the abdominal hair-bands white instead of yellowish. In this respect it resembles *C. tiburonensis* Cockerell, but that differs in other respects, as in the axillar spines, which are red, rather short, and curved in our insect. There is some resemblance to *C. texana* Cresson, but in our species the last sternite has a small but conspicuous pointed apical projection. According to Friese, *C. sanguinicollis* occurs

from Paraguay to Orizaba, Mexico. San José de Costa Rica must be considered the type locality.

Coelioxys ardescens subsp. *yucatanica* Cockerell (1931, p. 545).—One female.

Coelioxys speculifera Cockerell (1931, p. 545).—Two females.

Coelioxys bequaertiana Cockerell (1931, p. 548).—Two females.

Xylocopa barbatella Cockerell (1931, p. 417).—Three females.

Xylocopa pervirescens Cockerell (1931, p. 417).—One female.

CERATINA LATREILLE.

The species in the collection are readily separated thus:

1. Brilliant blue or emerald green species2
 General color dark3
2. Tegulae with posterior half clear rufo-fulvous; wings clear.
 itzarum Cockerell.
 Tegulae dark; wings dusky*yucatanica* Cockerell.
3. Marginal cell and adjacent parts included in a dark fuscous
 cloud*laticeps* Friese.
 Anterior wings without such a cloud4
4. Very small, less than 5 mm. long, dark olive green.
 nautlana Cockerell.
 Much larger5
5. Tergites, except the last, purplish with green margins.
 viridicincta Cockerell.
 Abdomen dark olive green *parignara* Cockerell.

Ceratina laticeps Friese.—One male. Previously known from Costa Rica. Friese described it in 1910, and again, as a new species, in 1921, but the two descriptions refer to the same insect. There is a large pallid area in the mesosternal region. This species is related to *C. marginata* Baker.

Ceratina nautlana Cockerell.—One female. Originally described from the State of Vera Cruz.

Ceratina itzarum Cockerell (1931, p. 548).—Three males and three females.

Ceratina yucatanica Cockerell (1931, p. 549).—One female.

Ceratina parignara Cockerell (1931, p. 549).—One male.

Ceratina viridicincta Cockerell (1931, p. 550).—Two females.

APPENDIX

By J. BEQUAERT

Mr. Herbert F. Schwarz kindly identified the following Meliponidae.

Trigona fulviventris Guérin.—Several workers and males.

Trigona cupira Smith, typical.—Several workers and two males. A nest of this bee was built in the stone wall of a house at Chankom.

Trigona capitata var. *sexmeniae* (Cockerell).—Numerous workers and males from a nest in a hollow trunk of a tree about two feet above the ground. On June 4, many males were observed sitting on the leaves of bushes near the entrance or hovering in the vicinity.

Trigona postica var. *pectoralis* (Dalla Torre).—A few workers. This *Trigona* is sometimes kept in a semi-domesticated state by the Maya Indians, but always in a few isolated hives, quite removed from the large apiaries of *Melipona beecheii* var. *fulvipes*.

Trigona amalthea (Olivier).—A few workers.

Trigona (*Nannotrigona*) *testaceicornis* (Lepelletier).—A few workers and one male.

Melipona beecheii var. *fulvipes* Guérin.—Several workers and one male. This is the species of stingless bee most commonly kept in a semi-domesticated state by the Maya Indians. Each hive is a hollow log, plugged at both ends, about two feet long and one-half to one foot across. A tiny entrance hole is bored on one side, generally in the center of a square surmounted by a small cross carved in the wood. Fifty or more of these hives are piled up in rows along slanting sticks placed in roof-fashion, five to eight hives to a row. The whole apiary is protected against the rain and the sun by a roof of thatch.

Bombus medius Cresson.—A few workers visiting the flowers of *Baltimora recta* L. and *Ruellia tuberosa* L., two common weeds in the cornfields of the Maya Indians. According to Dr. Geo. J. Gaumer, of Izamal, this bumblebee nests in old stone walls and in hollow trees. The species has been named by Mr. T. H. Frison and was the only bumblebee observed in Yucatan.

Murgantia histrionica in Mississippi; and Comment on the Incompleteness of Catalogues and Faunal Lists—Dr. Clay Lyle, of the State Plant Board of Mississippi, writes me that he was surprised to see my statement on p. 138, vol. xxvi of this BULLETIN, that my record of *Murgantia histrionica* from Biloxi was a new State record for this species. He refers me to Farmers Bulletin 1061, U. S. Department of Agriculture, in which Dr. Chittenden gives a distributional map which shows the species to be found in Mississippi. Dr. Lyle also tells me that the species is reported in practically every issue of the Insect Pest Survey of the Bureau of Entomology, especially in the late summer and fall, when the bug is most abundant.

Of course, my own attitude as to the purported distribution of Heteroptera in general, is most skeptical; many of the records to which I have referred have been according to the information available from the most recent catalogues or lists and accessible to me. Now, Government publications are not ordinarily sent to private students, except as an act of grace; officials of all kinds, however, get them whether they need them or not, quite automatically.

Hence, distributional oversights are bound to occur in the output of a private worker who must rely on catalogues—catalogues which, from the very flowing nature of the science can never be complete and up to the moment, and which are in fact obsolescent from the very instant they go to press.

So, I find I must correct an entirely involuntary error, which arose from my unfamiliarity with official publications.

However, on p. 139 of the same issue, I draw particular attention to the oddity that so well-known a bug as *Murgantia* should seem to be absent in Mississippi. My reluctance to accept this absence as an established fact was, as Dr. Lyle's letter shows, abundantly justified.

Nevertheless, the nonofficial private student of entomology will always be in peril of these omissions, from the nature and restricted circulation of official publications. I shall be at particular pains to make this evident in such distributional papers as I may publish in the future.—J. R. DE LA TORRE BUENO.